

### ABSTRACT

Classes of cognition models which may include: 1) Radio Environment models, 2) Mobility models and 3) Application/User Context models are utilized in a wireless communications network. Radio Environment models represent the physical aspects of the radio environment, such as shadowing losses, multi-path propagation, interference and noise levels, etc. Mobility models represent users motion, in terms of geo-coordinates and/or logical identifiers, such as street names etc. as well as speed of user terminal etc. The context model represents the present state and dynamics of each of these application processes within itself and between multiple application processes. These data are employed to optimize network performance.